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**STUDIES ON SPIROBOLOID MILLIPEDS. III. THE  
GENUS *SPIROBOLINUS* SILVESTRI**

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The preceding two parts of this series\* have dealt with the rhinocericid genus *Eurhinocricus*, defining the genus on the basis of gonopod structure and giving a list of the known species. *Eurhinocricus* provided a good example of a group having come to include species entirely unrelated to the generotype; the present paper is concerned with a genus which, although adequately described, dropped into obscurity through the neglect of later workers, and which seems to be unknown to recent students of the group.

This is *Spirobolinus* of Silvestri, proposed in 1898 for two Ecuadorian species, and diagnosed in the following words (translated):

“Labrum tridentate. Mandibles pluripectinate. Labral pores 4—4.

Antennae short. Collum laterally broad and not abbreviated. Pre-anal segment with a thickened elongate tail, exceeding the anal valves. Inner gonopods short.”

Although the preceding diagnosis is scarcely usable in itself, the two included species were well described in general, and the gonopods of the males were illustrated in fair detail. Brolemann, however, could not utilize the original descriptions in his classification of the spiroboloid millipeds, and wrote (1914: 5): “*Spirobolinus* Silvestri (1898, n), aucun rapprochement comparatif, les figures ne nous renseignent sur aucun des pointes essentiels.”

By 1926, nothing had been written in defense of the genus, and so *Spirobolinus* did not gain admission to Attems' treatment of the spiroboloids in the *Handbuch der Zoologie*, nor to Verhoeff's somewhat later (1932) summary of the group in Bronn's *Klassen und Ordnungen des Tierreichs*.

Fortunately, however, around the beginning of this century Silvestri and O. F. Cook exchanged a large number of paratypes of their milliped species, and it so happens in consequence that the United States National Museum has typical material of both *Spirobolinus luciae* and *S. nigrifulvus*. Through the kindness of Dr. E. A. Chapin, I have been able to study these valuable specimens, and am pleased to be able to rescue this hapless genus from its undeserved sojourn into oblivion. It will be observed that the accompanying illustrations of *S. luciae* do not differ appreciably from Silvestri's drawings except in matters of small detail probably due to subjective errors of execution.

The paratype of *S. nigrifulvus* in the National Museum is unfortunately

\*Pt. 1. Proc. Biol. Soc. Washington, vol. 66, 1953, pp. 179-184.

Pt. 2. Proc. Biol. Soc. Washington, vol. 68, 1955, pp. —.

a female, and I can add nothing to the original description of that species.

Genus SPIROBOLINUS Silvestri

*Spirobolinus* Silvestri, 1898, Boll. Mus. Zool. Anat. comp. Univ. Torino, vol. 13, no. 324, p. 8 (proposed with two species).

*Type*.—*Spirobolinus luciae* Silvestri, by present designation.

*Diagnosis*.—A genus of the suborder Spirobolidea, characterized by the absence of pores from the 7th segment, and by the small posterior gonopods which apparently lack coxal elements. The pores appear to be located in the metazonite, but the segmental suture makes a wide loop caudad to pass behind and below the pore.

Small species, less than 30 mm long, segments smooth and unmodified, lacking scobinae. Labral pores 4 on each side; antennae with 4 sensory cones. Telson produced caudad and definitely surpassing the anal valves, latter of normal form without thickened margins. No tarsal pads in either sex. Anterior gonopods with well developed triangular sternite and slender, distally produced coxite elements. Posterior gonopods small, without sternite and apparently without coxites.

*Range*.—Ecuador.

*Species*.—Two.

*Spirobolinus luciae* Silvestri

Figs. 1-6

*Spirobolinus luciae* Silvestri, 1898, Boll. Mus. Zool. Anat. comp. Univ. Torino, vol. 13, no. 324, p. 8, figs. 1-4.

*Description*.—From adult male topoparatype (labeled Cotype by Silvestri), collected at Pun, Ecuador, by Enrico Festa.

About 30 mm long, 2.9 mm in diameter, with 44 segments.

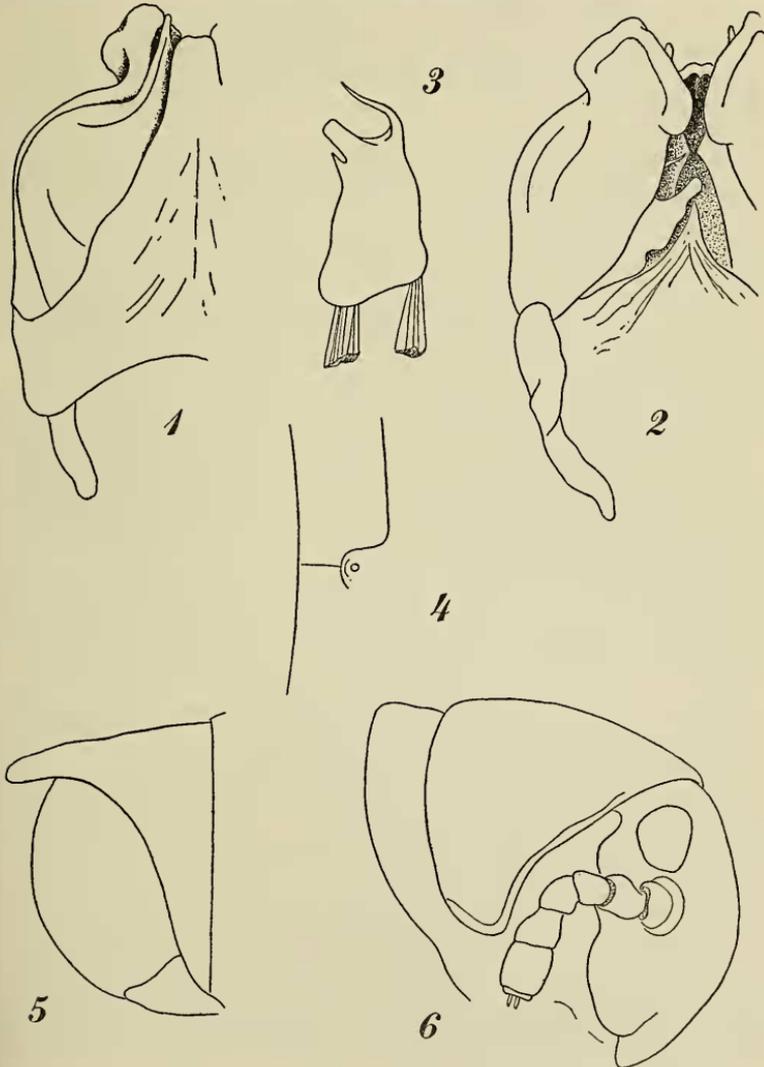
Color light brown, the dorsum paler, with a geminate middorsal stripe. In detail: yellowish brown or tan, somewhat darker on the sides below the pores and across dorsum of metazonites; each segment with a rectangular transverse black bar in front of the sulcus and a smaller spot in front of and behind it. Telson, front edge of collum, eyes, and a vertical frontal spot dark brown. Legs, antennae, and labral border yellowish.

Front of head smooth, clypeal pores 4—4; antennae short, not extending caudad past caudal edge of collum, the articles in decreasing order of length, 6-1-2-3-5-4-7; 4 terminal sensory cones; the proximal four articles almost glabrous. Mandibles rather deeply concave on their outer surface; sides of head below antennae immarginate. Eye patch small, rounded, about 25 ocelli in each cluster.

Collum smooth, narrowed somewhat toward the ends (fig. 6), its front edge with a marginal sulcus commencing just below level of eye patch. Second segment incurved ventrally, not as long as collum nor produced forward. Body segments smooth, with a distinct transverse sulcus across the dorsum but obsolete on the sides; the latter, especially of the prozonites, rather strongly striate near the legs; metazonites slightly raised above the level of the prozonites. Pores in a continuous series from the 6th to penultimate segment except that they are missing from the 7th; pores large and conspicuous, a small depression immediately caudad to each; pores well behind general level of the transverse sulcus which, however, is abruptly recurved caudad to pass behind them (fig. 4). No scobinae.

Telson smooth, without sulcus, produced into a depressed tail which considerably exceeds the anal valves (fig. 5), latter smooth and but slightly convex.

Male gonopods as illustrated (figs. 1 and 2). Sternal plate of anterior gonopods subtriangular, basally concave, distally exceeded by tips of both the coxites and telopodites, the latter considerably enlarged distally (fig. 2). Trachial stalks present, well sclerotized, firmly attached to base of sternite. Posterior gonopod small, flattened, without perceptible coxal joint and trachial stalk; distally modified into a long slender terminal process and a shorter, stouter subterminal process, the latter



subtended by a small tooth. Posterior gonopods concealed within the telopodite of the anterior pair, except for their tips (fig. 3).

Anterior legs of male without tarsal pads or other sexual modifications except that the coxae of the first few pairs are distally impressed or concave.

#### SYSTEMATIC POSITION

Having but one male specimen at my disposal, I am hesitant to make the step which will be necessary if my observations prove to be correct. That is, if the posterior gonopods actually consist of but a single piece, a new family will be required for the recognition of such a remarkable character. It is, of course, possible that a small coxal joint could have been broken off during dissection, although I made special efforts to prevent damage to the tiny appendage. But my drawing of this piece is quite similar to Silvestri's, and suggests that in fact the inner gonopod is fastened only by a band of muscle or ligament at each of its basal corners.

In other respects the genus appears similar to some of the Atopetholiidae of western North America, although a large triangular sternal plate is almost a characteristic of the family Rhinoericidae.

There is a possible junior synonym, in the form of Loomis's genus *Aporobolus* (1934), based upon a species from the island of Tobago. This species also lacks pores on the 7th segment, and has gonopods of the sort found in *Spirobolinus*. But until more material of both groups is at hand for comparison I think it best to keep them separate. Often a perfectly good name will become "lost" after unwarranted relegation to synonymy.

The classification of the spiroboloids is increasingly becoming incomprehensible through the proposals of new genera which are not compared by their authors with related established genera, and many founded upon mistaken concepts of anatomy. In the hope of abating the confusion I have begun to assemble materials for a revision of the order and hope to present in the near future an account of the genera so far erected and their type species.

Finally, it is some interest to observe that Silvestri overlooked the absence of pores from the 7th segment, since he normally placed great taxonomic significance to the distribution of the pore series, and separated more than a few spirostreptoid genera chiefly on such a basis.

#### LITERATURE CITED

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#### Explanation of Plate

Fig. 1. Left side of anterior gonopods, cephalic aspect. 2. Right side of anterior gonopods, caudal aspect, showing the largely concealed posterior gonopod. 3. Left posterior gonopod. 4. Repugnatorial pore on right side of body, showing position of segmental sutures. 5. Lateral aspect of caudal end of body, from right side of body. 6. Outline sketch of head capsule, antenna, and collum.